

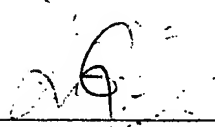
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CERTIFICATE OF ACCURACY

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COUNTY OF NEW YORK)

LAWRENCE GARFIELD, being duly sworn, deposes and says:

I am fluent in both the English and Japanese languages. I have made the attached English language translation of *Patent Application H4-330574: Thin-Type Contactless IC Card* in the Japanese language, and I hereby certify that the same is a true and complete translation to the best of my knowledge, ability, and belief.



LAWRENCE GARFIELD
Trustforte Language Services

Sworn to before me this
3rd day of September 2004



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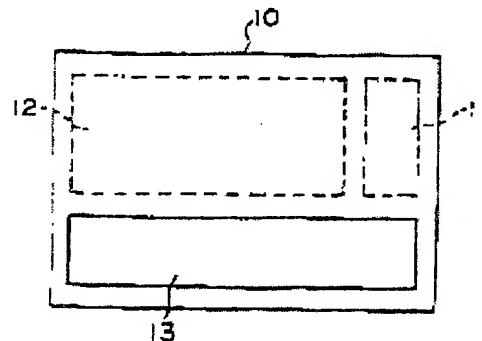
(54) [Title of the Invention] Thin-Type Contactless IC Card

(57) [Abstract]

[Purpose] To provide a thin-type contactless IC card, being a contactless IC card containing an IC module and a reception/transmission coil connected to the IC module for performing reception and transmission of signals contactlessly with an external device, and having improved portability by making the thickness thinner as a thin-type card form, and also having improved strength against bending and impact.

[Constitution] A thin-type contactless IC card, wherein a thin-type IC module and a thin-type reception/transmission coil are disposed on a plane without being made to overlap, in addition, plastic films are interposed on both sides of the thin-type IC module and the thin-type reception/transmission coil, furthermore they are held between plastic surface members from both sides, and they are fixed and integrated by thermocompression bonding.

[Effect] The portability is improved by making the thickness thinner as a thin-type card form, also the strength is improved against bending and impact, and the thin-type IC module and the thin-type reception/transmission coil are assuredly blocked from the outside, whereby it is possible to prevent damage to the thin-type IC module and the thin-type reception/transmission coil by intrusion of water from the outside.



[Claims]

[Claim 1] A thin-type contactless IC card, being a thin-type contactless IC card containing a thin-type IC module and a thin-type reception/transmission coil connected to the IC module for performing reception and transmission of signals contactlessly with an external device, and characterized in that said thin-type IC module and thin-type reception/transmission coil are disposed on a plane without being made to overlap, in addition, plastic films are interposed on both sides of the thin-type IC module and the thin-type reception/transmission coil, furthermore they are held between plastic surface members from both sides, and they are fixed and integrated by thermocompression bonding.

[Detailed Explanation of the Invention]

[0001]

[Field of Use in the Industry] The present invention relates to a contactless IC card containing an IC module and a reception/transmission coil connected to the IC module for performing reception and transmission of signals contactlessly with an external device, and in particular it relates to a thin-type contactless IC card having improved portability by making the thickness thinner as a thin-type card form, and also having improved strength against bending and impact.

[0002]

[Prior Art] Conventionally, as a contactless IC card containing an IC module and a reception/transmission coil connected to the IC module for performing reception and transmission of signals contactlessly with an external device, there is known one as shown in perspective view in Fig. 4, in which the IC module X and the reception/transmission coil Y are housed inside a plastic case body Z consisting of a box body Z1 and a cover body Z2 and the box body Z1 and the cover body Z2 are adhered, or one in which the IC module X and the reception/transmission coil Y are placed inside a mold and plastic is integrated by injection molding.

[0003]

[Problems the Invention Attempts to Solve] In the above conventional contactless IC cards, in the one which is housed inside a plastic case body Z consisting of a box body Z1 and a cover body Z2 and the box body Z1 and the cover body Z2 are adhered, there was a concern that if the adhesion between the box body Z1 and the cover body Z2 was insufficient, water may intrude inside from the place of adhesion and the IC module X and the reception/transmission coil Y may be damaged, and in addition, the thickness was as thick as about 10mm. Also, in the one in which the IC module X and the reception/transmission coil Y are placed inside a mold and plastic is integrated by injection molding, not only did it involve labor for placing the IC module X and the reception/transmission coil Y inside the mold, but also there were problems such as that if one formed thin, flat plate-shaped objects by injection molding, warping was caused, and those having good external appearance could not be obtained.

[0004]

[Means for Solving the Problems] The present invention solves the above problems, and its essence is a thin-type contactless IC card, being a thin-type contactless IC card containing a thin-type IC module and a thin-type reception/transmission coil connected to the IC module for performing reception and transmission of signals contactlessly with an external device, wherein said thin-type IC module and thin-type reception/transmission coil are disposed on a plane without being made to overlap, in addition, plastic films are interposed on both sides of the thin-type IC module and the thin-type reception/transmission coil, furthermore they are held between plastic surface members from both sides, and they are fixed and integrated by thermocompression bonding, whereby the portability is improved by making the thickness thinner as a thin-type card form, also the strength is improved against bending and impact, and the thin-type IC module and the thin-type reception/transmission coil are assuredly blocked from the outside, whereby it is possible to prevent damage to the thin-type IC module and the thin-type reception/transmission coil by intrusion of water from the outside.

[0005]

[Working Example] Below, a working example of the present invention is explained in detail based on the drawings. Fig. 1 is a plan view showing a thin-type contactless IC card of the present invention, Fig. 2 is a sectional view showing the essential components of a thin-type contactless IC card of the present invention, and Fig. 3 is a side sectional view showing the condition of manufacturing of a thin-type contactless IC card of the present invention.

[0006] As shown in plan view in Fig. 1, the external measurements of the thin-type contactless IC card 10 are horizontal measurement about 86mm, vertical measurement about 54mm, and the thickness is about 1mm. The thin-type contactless IC card 10 contains a thin-type IC module 11 having an IC memory (not illustrated) and a rectifying circuit, and the like (not illustrated), and a thin-type reception/transmission coil 12 connected to the thin-type IC module 11. 13 is an embossed area, and it is formed avoiding the position where the thin-type IC module 11 is contained and the position where the thin-type reception/transmission coil 12 is contained. Thus, if the embossed area 13 is formed avoiding the position where the thin-type IC module 11 is contained and the position where the thin-type reception/transmission coil 12 is contained, it is optimal because even though the embossed area 13 is embossed, there is little influence on the thin-type IC module 11 and the thin-type reception/transmission coil 12. As shown in sectional view in Fig. 2, the thickness T1 of the thin-type IC module 11 is about 0.3mm. The thin-type reception/transmission coil 12 has a copper wire 12b having a diameter of about 0.1mm wound on a flat plate-shaped ferrite core 12a having a thickness T2 of about 0.4mm, and the thickness T3 is about 0.5mm. The thin-type reception/transmission coil 12 performs reception and transmission of information stored in the thin-type IC module 11 with an external device by electromagnetic coupling or electromagnetic induction with the external device. The alternating current excited by the thin-type reception/transmission coil 12 is rectified by the rectifying circuit provided in the thin-type IC module 11, and it is taken as the power supply of the thin-type IC module 11. Therefore, there is no need to separately contain a battery.

[0007] 14, 14 are plastic films made of polyvinyl chloride, or the like, having a thickness of about 0.1mm, and they are interposed so as to hold between them the thin-type IC module 11 and the thin-type reception/transmission coil 12 from both sides of the thin-type IC module 11 and the thin-type reception/transmission coil 12, and in addition, this is held between plastic surface members 15, 15 made of polyvinyl chloride, or the like, from both sides of the plastic films 14, 14 made of polyvinyl chloride, or the like, having a thickness of about 0.3mm, they are fixed and integrated by thermocompression bonding, and the thickness is about 1mm.

[0008] To manufacture a thin-type contactless IC card 10 of the present invention, as shown in side sectional view in Fig. 3, the thin-type IC module 11 and the thin-type reception/transmission coil 12 should be placed so as not to overlap, the plastic films 14, 14 made of polyvinyl chloride, or the like, having a thickness of about 0.1mm should be interposed on both sides of the thin-type IC module 11 and the thin-type reception/transmission coil 12, furthermore they should be held from both sides between the plastic surface members 15, 15 made of polyvinyl chloride, or the like, having a thickness of about 0.3mm, and then they should be fixed and integrated by thermocompression bonding between hot plates 20, 20.

[0009]

[Effect of the Invention] According to the present invention as above, the thin-type IC module and the thin-type reception/transmission coil are disposed on a plane without being made to overlap, in addition, plastic films are interposed on both sides of the thin-type IC module and the thin-type reception/transmission coil, furthermore they are held between plastic surface members from both sides, and they are fixed and integrated by thermocompression bonding, whereby it has advantages such as that the portability is improved by making the thickness thinner as a thin-type card form, also the strength is improved against bending and impact, and the thin-type IC module and the thin-type reception/transmission coil are assuredly blocked from the outside, whereby it is possible to prevent damage to the thin-type IC module and the thin-type reception/transmission coil by intrusion of water from the outside.

[Brief Explanation of the Drawings]

[Fig. 1] is a plan view showing a thin-type contactless IC card of the present invention.

[Fig. 2] is a sectional view showing the essential components of a thin-type contactless IC card of the present invention.

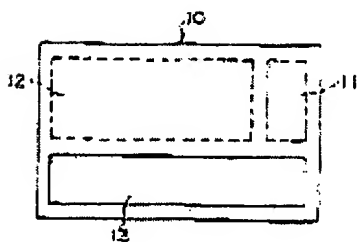
[Fig. 3] is a side sectional view showing the condition of manufacturing of a thin-type contactless IC card of the present invention.

[Fig. 4] is a perspective view showing a conventional contactless IC card.

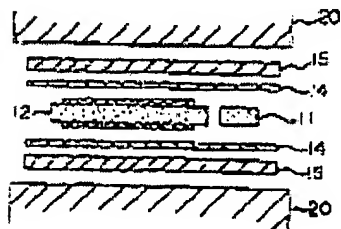
[Explanation of the Symbols]

- | | |
|----|---------------------------------------|
| 10 | Thin-type contactless IC card |
| 11 | Thin-type IC module |
| 12 | Thin-type reception/transmission coil |
| 13 | Embossed area |
| 14 | Plastic film |
| 15 | Plastic surface member |

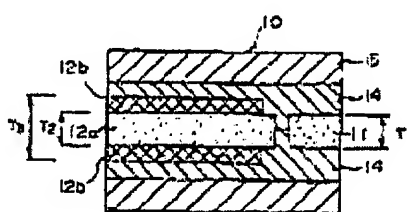
[Fig. 1]



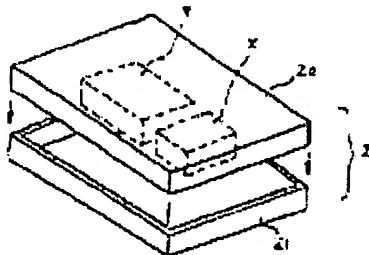
[Fig. 3]



[Fig. 2]



[Fig. 4]



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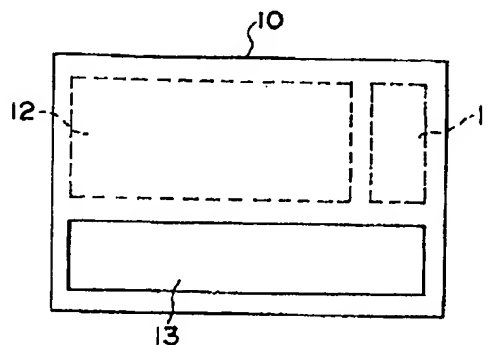
(54) 【発明の名称】 薄型非接触 I C カード

(57) 【要約】

【目的】 I C モジュールと、I C モジュールに接続され外部装置と非接触で信号の受発信を行う受発信用コイルを内蔵した非接触 I C カードであって、厚みを薄くして薄型のカード状とすることにより、携帯性を向上させると共に、曲げ、衝撃に対する強度を向上させた薄型非接触 I C カードを提供する。

【構成】 薄型 I C モジュールおよび薄型受発信用コイルを重ね合わせることなく平面配置すると共に、薄型 I C モジュールおよび薄型受発信用コイルの両面にプラスチック製フィルムを介在させ、さらに両面からプラスチック製表面材で挟持して、加熱圧着して固着一体化した薄型非接触 I C カード。

【効果】 厚みを薄くして薄型のカード状とすることにより、携帯性を向上させると共に、曲げ、衝撃に対し強度を向上させ、薄型 I C モジュールおよび薄型受発信用コイルを外部から確実に遮蔽して、外部から水が侵入して薄型 I C モジュールおよび薄型受発信用コイルが破損するのを防止することができる。



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【特許請求の範囲】

【請求項1】薄型ICモジュールと、該薄型ICモジュールに接続され外部装置と非接触で信号の受発信を行う薄型受発信用コイルを内蔵した薄型非接触ICカードであって、前記薄型ICモジュールおよび薄型受発信用コイルを重ね合わせることなく平面配置すると共に、薄型ICモジュールおよび薄型受発信用コイルの両面にプラスチック製フィルムを介在させ、さらに両面からプラスチック製表面材で挟持して、加熱圧着して固着一体化したことを特徴とする非接触ICカード。

【発明の詳細な説明】

【0001】

【産業上の利用分野】本発明は、ICモジュールと、ICモジュールに接続され外部装置と非接触で信号の受発信を行う受発信用コイルを内蔵した非接触ICカードに関し、とくに厚みを薄くして薄型のカード状とすることにより、携帯性を向上させると共に、曲げ、衝撃に対する強度を向上させた薄型非接触ICカードに関する。

【0002】

【従来の技術】従来、ICモジュールと該ICモジュールに接続され外部装置と非接触で信号の受発信を行う受発信用コイルを内蔵した非接触ICカードとしては、図4に斜視図で示すように、ICモジュールXと受発信用コイルYとを、プラスチック製の箱体Z1と蓋体Z2とからなる匡体Z内に収納し、箱体Z1と蓋体Z2とを接着したもの、あるいはICモジュールXと受発信用コイルYとを金型内に配置し、プラスチックを射出成形して一体化するものが知られている。

【0003】

【発明が解決しようとする課題】上記従来の非接触ICカードでは、プラスチック製の箱体Z1と蓋体Z2とからなる匡体Z内に収納し、箱体Z1と蓋体Z2とを接着するものにおいては、箱体Z1と蓋体Z2との接着が十分でないと、接着箇所から水が内部に侵入し、ICモジュールXと受発信用コイルYが破損するおそれがあり、また、厚みも約1.0mmと厚いものであった。また、ICモジュールXと受発信用コイルYとを金型内に配置し、プラスチックを射出成形して一体化するものにおいては、金型内にICモジュールXと受発信用コイルYとを配置するのに手間がかかるばかりか、射出成形により、平板状で、厚みが薄いものを成形すると、反りが生じ、外觀上好ましいものが得られない等の問題点があった。

【0004】

【課題を解決するための手段】本発明は、上記課題を解決するものであって、その要旨は、薄型ICモジュールと、該薄型ICモジュールに接続され外部装置と非接触で信号の受発信を行う薄型受発信用コイルを内蔵した薄型非接触ICカードであって、前記薄型ICモジュール

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配置すると共に、薄型ICモジュールおよび薄型受発信用コイルの両面にプラスチック製フィルムを介在させ、さらに両面からプラスチック製表面材で挟持して、加熱圧着して固着一体化することにより、厚みを薄くして薄型のカード状とすることにより、携帯性を向上させると共に、曲げ、衝撃に対し強度を向上させ、薄型ICモジュールおよび薄型受発信用コイルを外部から確実に遮蔽して、外部から水が侵入して薄型ICモジュールおよび薄型受発信用コイルが破損するのを防止した薄型非接触ICカードである。

【0005】

【実施例】以下、本発明の実施例を図面にに基づき具体的に説明する。図1は本発明の薄型非接触ICカードを示す平面図、図2は本発明の薄型非接触ICカードの要部を示す断面図、図3は本発明の薄型非接触ICカードを製造する状態を示す側断面図である。

【0006】図1に平面図で示すように、薄型非接触ICカード10の外径寸法は、横寸法が約8.6mm、縦寸法が約5.4mmであり、厚みは約1mmである。薄型非接触ICカード10には、ICメモリ（図示略）と整流回路等（図示略）を内蔵した薄型ICモジュール11と、該薄型ICモジュール11に接続された薄型受発信用コイル12を内蔵している。13はエンボス領域であって、薄型ICモジュール11が内蔵された位置と薄型受発信用コイル12が内蔵された位置を避けて形成してある。このように、エンボス領域13を、薄型ICモジュール11が内蔵された位置と薄型受発信用コイル12が内蔵された位置を避けて形成すると、エンボス領域13にエンボス加工をしても、薄型ICモジュール11および薄型受発信用コイル12に影響が少ないので、好適である。図2に断面図で示すように、薄型ICモジュール11の厚みT1は、約0.3mmとしてある。薄型受発信用コイル12は、厚さT2が約0.4mmの平板状フェライトコア12aに、直径が約0.1mmの銅線12bを巻き付け、その厚さT3は約0.5mmとしてある。薄型受発信用コイル12は、外部装置と電磁結合または電磁誘導により、薄型ICモジュール11に記憶される情報を外部装置と非接触で受発信する。薄型ICモジュール11に設けられた整流回路により、薄型受発信用コイル12に誘起された交流電流を整流して薄型ICモジュール11の電源とされる。このため、電池を別途内蔵する必要はない。

【0007】14、14は厚みが約0.1mmのポリ塩化ビニル樹脂製等のプラスチック製フィルムであって、薄型ICモジュール11および薄型受発信用コイル12の両面から、これら薄型ICモジュール11および薄型受発信用コイル12を挟持するようにして介在させてあると共に、厚みが約0.3mmのポリ塩化ビニル樹脂製等のプラスチック製フィルム14、14の両面からポリ塩化ビニル樹脂製等のプラスチック製表面材15、15

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で挟持して、加熱圧着して固着一体化し、厚みが約1mmとしてある。

【0008】本発明の薄型非接触ICカード10を製造するには、図3に側断面図で示すように、薄型ICモジュール11と薄型受発信用コイル12とを重ね合わせるようにして配置し、薄型ICモジュール11および薄型受発信用コイル12の両面に厚みが約0.1mmのポリ塩化ビニル樹脂製等のプラスチック製フィルム14、14を介在させ、さらに両面から厚みが約0.3mmのポリ塩化ビニル樹脂製のプラスチック製表面材15、15で挟持した後、両面から熱板20、20で加熱圧着して固着一体化すれば良い。

【0009】

【発明の効果】以上の通り、本発明によれば、薄型ICモジュールおよび薄型受発信用コイルを重ね合わせることなく平面配置すると共に、薄型ICモジュールおよび薄型受発信用コイルの両面にプラスチック製フィルムを介在させ、さらに両面からプラスチック製表面材で挟持して、加熱圧着して固着一体化することにより、厚みを薄くして薄型のカード状とすることにより、携帯性を向

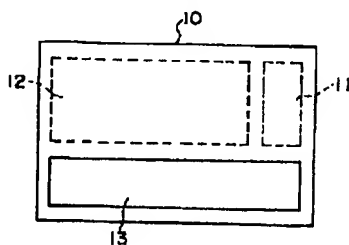
10 【図3】本発明の薄型非接触ICカードを製造する状態を示す側断面図

【図4】従来の非接触ICカードを示す斜視図

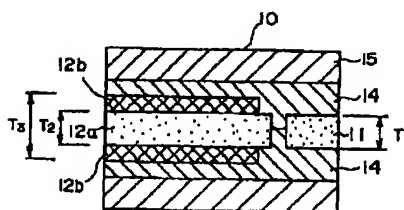
【符号の説明】

- 10 薄型非接触ICカード
- 11 薄型ICモジュール
- 12 薄型受発信用コイル
- 13 エンボス領域
- 14 プラスチック製フィルム
- 15 プラスチック製表面材

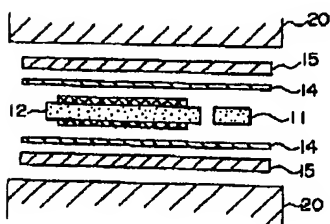
【図1】



【図2】



【図3】



【図4】

